

Examining the Impact of Omnichannel Service Failures and Recovery on Customer Stickiness Intention

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Abstract

The purpose of this paper is to examine the influence of omnichannel service failures and service recovery on customers' stickiness intention. Drawing on Expectation Confirmation Theory (ECT), this study develops an integrated framework and categorizes service failures into two dimensions—online service failures and offline service failures—based on the characteristics of the omnichannel environment. In addition, a questionnaire survey was conducted to empirically investigate the relationships among service failures, service recovery, and stickiness intention within the context of omnichannel services. The findings reveal that both online and offline service failures exert a significant negative effect on customers' stickiness intention, whereas service recovery exerts a significant positive effect. Finally, the study provides actionable recommendations for omnichannel service providers to strengthen customers' stickiness intention.

Keywords: Omnichannel Service, Service Failure, Service Recovery, Stickiness Intention, Expectation Confirmation Theory

I. Introduction

With the continuous rise in global internet penetration and the widespread adoption of smartphones, consumers have grown increasingly accustomed to engaging in online shopping. In today's digital economy, virtually any product or service can be accessed and purchased through digital platforms. Furthermore, the outbreak of Coronavirus Disease 2019 (COVID-19) prompted individuals to purchase larger quantities during each visit to physical stores in an effort to reduce the frequency of outings and mitigate infection risks. Although the direct threat of COVID-19 has gradually subsided, the behavioral pattern of "fewer trips, larger purchases" has persisted, illustrating how the pandemic has fundamentally reshaped consumer lifestyles. This transformation has extended beyond social interaction and hygiene practices to significantly influence purchasing behaviors for everyday necessities. In response to these shifts, many major brick-and-mortar retailers have accelerated the integration of their physical and digital channels, aiming to provide consumers with seamless, interconnected, and personalized shopping experiences [1]. These developments suggest that the provision of omnichannel services is emerging as a critical trend in contemporary retail operations.

The key difference between multichannel and omnichannel retailing lies in the level of integration across channels. Multichannel retailing provides customers with access to products or services through multiple independent channels, such as physical stores, websites, or mobile applications, but these channels typically operate in isolation. In contrast, omnichannel retailing emphasizes delivering a seamless and comprehensive 24/7 shopping environment, enabling

customers to engage in purchases anytime and anywhere—whether via desktop, smartphone, or tablet—while ensuring consistency and continuity across all channels [2].

However, as retail sales have increased, so too have the volume of consumer complaints and disputes. With rising customer expectations for product and service quality, even minor shortcomings may trigger dissatisfaction and complaints. In some cases, a single negative experience may deter future purchases, prompting customers to switch brands [3]. This trend is particularly evident in online retail environments, where switching platforms is as simple as clicking a button. As a result, many customers encountering service failures online choose to abandon the transaction and terminate their relationship with the platform altogether. Nevertheless, if service failures are handled appropriately, customers are willing to continue patronizing the business. It means underscore the strategic importance of effective service recovery in preventing customer attrition [4]. While prior studies have extensively examined service failures, most have focused on traditional offline contexts such as department stores, restaurants, airlines, and hotels, or have analyzed online service failures in isolation. Comparatively less attention has been devoted to the complexities of service failures within omni-channel environments, where digital and physical touchpoints converge. Moreover, the nature and recovery strategies of service failures in online settings differ markedly from those in offline channels [5], further emphasizing the need for targeted research within integrated omni-channel frameworks. A deeper understanding of service failures and recovery mechanisms in this context is essential for both theoretical development and managerial practice.

El-Manstrly et al. [6] further emphasized the significance of website stickiness—defined by visit frequency, depth, and duration—as a key antecedent to consumer behaviors such as purchasing, responding to promotions, and engaging in community interaction. Stickiness plays a crucial role in shaping behavioral intentions and converting casual visitors into loyal buyers. As e-commerce competition intensifies and marketing strategies become increasingly homogeneous, Taiwanese retailers are experiencing revenue declines and a gradual erosion of their physical customer base. To remain competitive, retailers—whether operating through physical storefronts, online platforms, or social media—must actively strengthen customer relationships and integrate all consumer touchpoints to deliver a consistent, seamless experience. In this context, identifying the key drivers of omnichannel service stickiness emerges as a vital agenda for both academic inquiry and practical application. A review of the existing omni-channel literature reveals that most studies have focused on understanding consumer preferences for online versus offline channels under varying conditions [7-9], or on examining how technological advancements affect the omni-channel shopping experience [1; 10]. However, only limited research has explored the interrelationships among omnichannel service failures, service recovery efforts, and customer stickiness [11]. These insights highlight a critical research gap and reinforce the academic and managerial value of investigating how service failures and recovery strategies jointly influence consumer stickiness in an omnichannel context.

II. Theoretical Background and Hypotheses

1. Expectation Confirmation Theory (ECT)

Generally, prior to purchasing a specific product or service, consumers tend to form certain expectations regarding its anticipated performance. Following consumption or usage, they develop a perceived performance based on their actual experience. Subsequently, consumers evaluate the extent to which the perceived performance aligns with their initial expectations—this alignment is referred to as the degree of confirmation. This evaluative process forms the foundation of Expectation Confirmation Theory (ECT) [12]. ECT has been extensively applied in consumer behavior literature to examine consumer satisfaction, post-purchase behaviors (e.g., repurchase intentions, complaint behaviors), and broader service marketing contexts [13]. According to the theory, when perceived performance exceeds expectations, a positive disconfirmation occurs; when perceived performance matches expectations, it results in simple confirmation; and when perceived performance falls short of expectations, a negative disconfirmation arises [14-16]

2. Service failure

Service failure refers to a situation in which service performance falls short of customer expectations [17; 18]. Specifically, it occurs when a company fails to meet customer expectations during face-to-face service interactions [19; 20]. Such failures often result in customer dissatisfaction and the dissemination of negative word of mouth, with the likelihood of negative communication increasing in proportion to the level of customer dissatisfaction [21]. Beyond diminishing the overall service experience, service failure also increases the risk of customer attrition [22; 23]. Bitner et al. [24], employing the critical incident technique, analyzed service failures in sectors such as airlines, hotels, and restaurants, and categorized them into three types: (1) employee responses to service delivery system failures, (2) employee responses to customer needs and requests, and (3) unprompted and unsolicited employee actions.

Tan et al. [4] defined e-commerce service failure as the inability of an online platform to provide the technical capabilities required for customers to complete essential transactional tasks or achieve their intended goals. The full transaction process—from initial product or service inquiry through to delivery and post-purchase satisfaction—constitutes the scope of service provision[25]. Holloway and Beatty [26] further classified online service failures into six categories: delivery problems, website design problems, customer service problems, payment problems, security problems, and miscellaneous/other. Additionally, Tan et al. [4] proposed an alternative framework that groups e-commerce service failures into three domains: information failures, functional failures, and system failures.

3. Service recovery

Ha and Jang [21] define service recovery as the actions taken by service providers in response to customer complaints arising from perceived service failures. They further suggest that when service failures are effectively resolved, customers may develop a stronger sense of commitment to the company than they had prior to the failure. In other words, a successful service recovery has the potential to enhance customer commitment beyond levels observed in failure-free situations. The ultimate goal of service recovery is to restore customer satisfaction through appropriate corrective actions, thereby minimizing the potential damage to the customer relationship caused by the service failure. Chou [27] further emphasizes that service recovery involves both the actions taken by an organization in response to service failures and

the process through which those errors are addressed. During the recovery process, customers typically expect that any losses incurred as a result of the service failure will be fairly compensated—an expectation that lies at the heart of justice theory. Justice theory explains how individuals respond to situations of conflict, making it a foundational framework in the study of service recovery, which inherently involves a conflict between customer expectations and actual service performance [28]. The theory comprises three key dimensions: distributive justice, interactional justice, and procedural justice, each of which plays a vital role in shaping customer perceptions of fairness during the service recovery process [29].

4. Stickiness intention

Website stickiness refers to a website's ability to retain users and prolong the duration of their visits. It reflects the extent to which a website captures and sustains users' attention [30; 31]. In other words, website stickiness denotes how appealing a website is to users, or the degree of psychological attachment users develop toward it [32; 33]. Li et al. [34] define website stickiness as the extent to which users, driven by a deep-rooted sense of commitment, are inclined to revisit or continue using a website over time—even in the face of contextual influences or competing marketing efforts that might otherwise prompt switching behavior. Similarly, El-Manstrly et al. [6] identify three behavioral indicators of website stickiness in virtual travel communities: frequency, depth, and duration of visits. In the context of virtual communities, enhancing stickiness translates into cultivating a loyal user base with continued interest and participation. Thus, website stickiness reflects the website's capacity to foster sustained user engagement, encouraging users to stay longer, explore more content, and return frequently—rather than switching to alternative platforms.

This study begins by categorizing omnichannel service failure into online and offline service failures, reflecting the integration of physical and digital channels in providing customer service. Drawing on the Expectation Confirmation Theory (ECT), the study investigates how customers experience and evaluate both online and offline service failures within an omnichannel context. With regard to online service failure, the study posits that customers assess the performance of online services by comparing their prior expectations with the perceived performance of the online platform. For instance, service dimensions such as website design problems, delivery problems, payment problems, and customer service problems collectively influence customers' intention to place orders through the omnichannel service website [26]. When the perceived online performance falls short of customers' expectations, an online service failure is deemed to have occurred. Similarly, in terms of offline service failure, customers evaluate service performance by comparing their expectations of offline service experiences with the actual performance delivered by the offline service provider. For example, service performance in terms of employee response to service delivery system failures, employee response to customer needs and requests, and unprompted and unsolicited employee actions [24] will determine whether customers are willing to purchase goods from offline service provider. When the offline service performance does not meet customers' expectations, offline service failure is said to occur. Following this, the study examines the impact of both online and offline service failures on customer stickiness. In the next stage, the research incorporates the three dimensions of justice theory—distributive justice, interactional justice, and procedural justice [29]—to explore how omnichannel service recovery efforts influence customer stickiness. Finally, based on empirical findings, the study

offers concrete recommendations for omnichannel service providers aiming to enhance customer stickiness and optimize service recovery strategies. The research model is illustrated in Figure 1, and the associated hypotheses are detailed below.

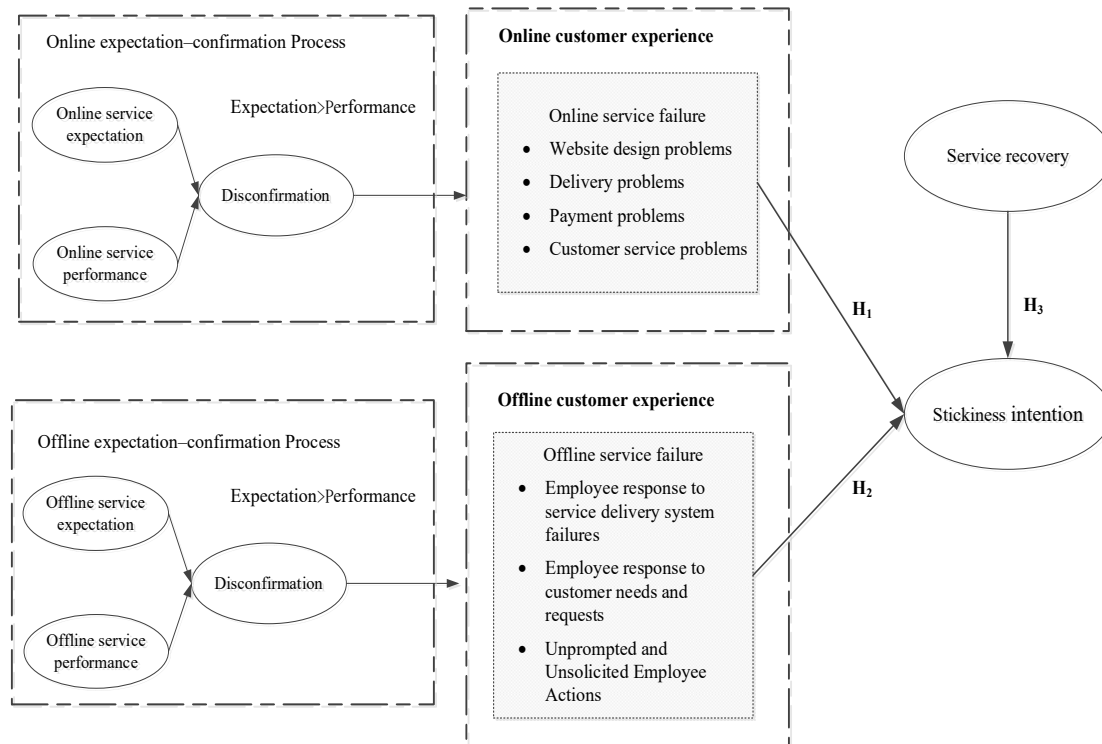


Figure 1: Research model.

5. Hypotheses development

Steyn et al. [35] noted that service failure is a frequent occurrence in the process of service delivery and often has a significant impact on the customer's overall service experience. Service failure arises when customers perceive that the service provided does not meet their expectations, which can lead to dissatisfaction [27]. The greater the level of customer dissatisfaction, the more likely it is that customers will engage in negative word-of-mouth communication regarding their experience [21]. In the context of online services, Nyagadza et al. [13], in their study on e-banking satisfaction, emphasized that service failures resulting from operational challenges are largely unavoidable. If service recovery efforts do not align with customer expectations, the likelihood of customers switching to alternative service providers increases substantially. Their findings also indicate that the three dimensions of justice theory—distributive, interactional, and procedural justice—have a positive effect on customer satisfaction during the service recovery process. In the realm of offline services, Harrison-Walker [36] investigated the critical role of customer forgiveness in successful service recovery across six service industries, including food and beverage, healthcare, passenger transport, beauty salons, fitness centers, and car rental services. The study identified common service failures such as long wait times, impolite or unresponsive staff, billing errors, and poor maintenance work. These failures can lead to various adverse customer reactions,

including refusal to repurchase, formal complaints, and negative word-of-mouth communication. Similarly, Cheng and Hwang [37] noted that service failures and the corresponding recovery processes are prevalent in the restaurant industry, and that effective management of such incidents can significantly enhance service quality and customer retention. Overall, service failures may result in customer defection, reputational damage through negative word-of-mouth, or even retaliatory behaviors that undermine a company's reputation or profitability [38].

Harris et al. [39] emphasized that service recovery has a significant positive impact on customer satisfaction with both online and offline services. Service recovery refers to the corrective actions undertaken by a company to address and compensate for service failures. When complaints are effectively resolved, customer satisfaction can be restored, which in turn enhances trust and commitment, promotes positive word-of-mouth, and increases the likelihood of customer return and continued engagement with the company[40]. Conversely, inadequate service recovery efforts often result in customer defection, as dissatisfied customers are more likely to discontinue their relationship with the service provider [41]. According to Wang et al. [42], customer satisfaction significantly shapes trust and commitment, which are key drivers of continued engagement with group-buying platforms. Building on these insights, the present study posits that whether customers encounter service failures in online or offline settings within an omnichannel service environment, such experiences will directly affect their satisfaction with the overall service. This satisfaction, in turn, influences their behavioral intentions—specifically their willingness to reuse, frequency of use, and duration of interaction with the omnichannel service. Moreover, if omnichannel service providers are able to deliver effective and satisfactory recovery measures in response to service failures, customer stickiness intention toward the omnichannel platform is likely to increase. Based on this reasoning, the following hypothesis is proposed:

H1: The online service failures negatively affects customer' stickiness intention.

H2: The offline service failures negatively affects customer' stickiness intention.

H3: Service recovery positively affects customer' stickiness intention.

III. Methodology

1. Sampling

This study targets consumers who have utilized omnichannel services—spanning both online and offline channels—and who have experienced service failures followed by remediation efforts. Given that low participant engagement could compromise the completeness and reliability of the collected data, convenience sampling was employed to recruit individuals deemed appropriate for completing the research questionnaire. Respondents were initially approached through online communities, and upon confirming their willingness to participate, the questionnaire link was distributed to these recruited participants. In addition, participants were encouraged to refer other eligible individuals—specifically those with prior omnichannel service experiences involving both failure and recovery—to take part in the survey. The questionnaire was administered over a ten-day period beginning on May 10, 2025, yielding a total of 162 valid responses. Descriptive statistics of the respondents' demographic characteristics are summarized in Table 1.

Table 1: demographic characteristics of the respondents ($n = 162$).

Characteristics	Levels	Percentage (%)
Gender	Male	45.7
	Female	54.3
Age	≤ 19 years old	10.5
	20-29 years old	17.9
	30-39 years old	21.6
	40-49 years old	33.3
	≥ 50 years old	16.7
Education level	High school and below	4.9
	College	9.3
	University	40.7
	Master's degree and above	45.1

2. Measures instruments

The measurement items used in the questionnaire were developed based on an extensive review of relevant literature. First, online service failure is defined in this study as a situation in which the performance of online services falls short of customer expectations [17; 18]. The corresponding measurement items were adapted from the six categories of service failure proposed by Holloway and Beatty [26], namely: website design problems, delivery problems, payment problems, customer service problems, security problems, and miscellaneous/other issues. To align with the context of omnichannel services and to ensure the conceptual independence of each sub-facet, this study integrates security problems into the payment problems category, and incorporates miscellaneous/other issues into the customer service problems category. Second, offline service failure is similarly defined as a situation in which the performance of offline services fails to meet customer expectations [17; 18]. The measurement items were derived from the three categories identified by Bitner et al. [24]: employee responses to service delivery system failures, employee responses to customer needs and requests, and unprompted and unsolicited employee actions. These items were likewise adapted to the omnichannel context. Service recovery is defined as both the actions taken by an organization to respond to service failures and the process by which such failures are addressed [27]. Measurement items for this construct were adapted from a widely used scale developed by Wang et al. [43], and reflect the three dimensions of justice theory: distributive justice, interactional justice, and procedural justice [2; 28]. Finally, the construct of stickiness intention refers to the extent to which an omnichannel service can sustain user engagement by encouraging users to stay longer, explore more content, and return frequently rather than switch to alternative providers [6]. The corresponding questionnaire items were adapted from Li et al. [34] and Wang et al. [43]. A seven-point Likert scale was employed for all items, ranging from 1 (strongly disagree) to 4 (neutral) to 7 (strongly agree), to assess participants' level of agreement with each statement. The final questionnaire items and their respective sources are presented in Table 2.

Table 2: the questionnaire items and related references

Research variables	Items
Holloway and Beatty [26]; Rao et al. [17]; Wang et al. [43]	
Online service failure	NSF1. The information provided by the omnichannel operator through the online channel was not as complete as I originally expected.
	NSF2. The navigation function of the online channel was not as easy to understand as I had expected.
	NSF3. The delivery time of the products I purchased through the online channel was not as fast as I had expected.
	NSF4. The delivery specifications or items of the products I purchased through the online channel were not as accurate as I had expected.
	NSF5. The quality of the products or services I purchased through the online channel was not as good as I had expected.
	NSF6. The transaction process of the online channel was not as accurate as I had expected.
	NSF7. The billing process of the online channel was not as accurate as I had expected.
	NSF8. The online customer service did not respond to my needs as quickly as I had expected.
	NSF9. The after-sales service provided through the online channel was not as good as I had expected.
Bitner et al. [24]; Rao et al. [17]; Wang et al. [43]	
Offline service failure	FSF1. The service provided by the offline physical store of the omnichannel operator was not as good as I had expected.
	FSF2. The offline physical store staff did not respond to my needs as quickly as I had expected.
	FSF3. The service attitude of the offline physical store staff was less friendly than I had expected.
	FSF4. The offline physical store staff was not sufficiently knowledgeable about the products to help me make an informed purchase decision.
Chang et al. [28]; Chou [27]; Tseng [2]; Wang et al. [43]	
Service recovery	Distributive Justice
	DJ1. I believe the omnichannel provider was fair in compensating me for the problem I encountered.
	DJ2. I believe the omnichannel provider made an effort to offer sufficient compensation to satisfy me.
	Interactional Justice
	IJ1. I felt that the omnichannel provider put a lot of effort into resolving my problem.
	IJ2. I felt that the omnichannel provider considered my problem from my point of view.
	Procedural Justice
	PJ1. I believe my problem was resolved in an appropriate manner.
Stickiness	PJ2. I believe the omnichannel provider has good policies and procedures in place for handling problems.
	SI1. I intend to continue using this omnichannel service rather than switch to other alternatives.
	SI2. I am likely to spend more time on this omnichannel service compared to other channel options.
	SI3. I intend to increase the amount of time I spend using this omnichannel service.
	SI4. I plan to continue using this omnichannel service in the future.

3. Data analysis procedure

Initially, Exploratory Factor Analysis (EFA) was conducted to identify the underlying dimensions of the key constructs: online service failure, offline service failure, service recovery, and stickiness intention. Measurement items that did not meet the threshold criteria for factor retention were excluded from subsequent analyses. Specifically, for the constructs of

online service failure, offline service failure, and service recovery, items NSF9, FSF4, IJ1, and PJ1 were removed due to insufficient discriminant validity, as indicated by a factor loading difference of less than 0.30 between their primary and secondary factors [44]. In contrast, all items associated with the construct of stickiness intention satisfied the required statistical criteria and were therefore retained in the model. Following the EFA, Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were conducted to validate the measurement model and to examine the hypothesized relationships within the conceptual framework. For the structural analysis, this study adopted Partial Least Squares Structural Equation Modeling (PLS-SEM). Compared to traditional covariance-based SEM, PLS-SEM offers greater flexibility regarding distributional assumptions, measurement scale types, and sample size requirements [45; 46]. Given the exploratory nature of this research—particularly its aim to develop and test a novel framework incorporating online service failure, offline service failure, service recovery, and stickiness intention—PLS-SEM was deemed the most appropriate analytical approach. All statistical analyses were performed using SmartPLS 4.0 software.

IV. Results

1. The measurement model

The properties of the three proposed research constructs were evaluated using Structural Equation Modeling (SEM). A null model was initially specified for the first-order latent variables, in which no structural relationships were imposed. To assess the reliability of the measurement instruments, three indicators were calculated: Composite Reliability (CR), Cronbach's Alpha (CA), and Average Variance Extracted (AVE). As presented in Table 3, all CR and CA values exceeded the recommended threshold of 0.70, with the lowest CR and CA values reported at 0.816, indicating strong internal consistency reliability [47]. Furthermore, all AVE values surpassed the cut-off value of 0.50, with the lowest AVE reported at 0.627, thereby confirming satisfactory convergent validity [45]. To assess discriminant validity, the Fornell-Larcker criterion was applied. As shown in Table 4, the square root of the AVE for each construct exceeded the inter-construct correlations, demonstrating good discriminant validity [48]. Additional support for discriminant validity was found through the inspection of cross-loadings, where each indicator loaded more highly on its corresponding construct than on any other constructs [45; 46]. Taken together, the results presented in Tables 3 and 4 provide strong evidence for the internal consistency reliability, indicator reliability, convergent validity, and discriminant validity of the measurement model [49].

2. Structural model

The structural model was employed to examine the hypothesized relationships among the latent dependent and independent constructs. To assess the significance of the path coefficients, a bootstrapping procedure with 5,000 resamples was performed using the original dataset of 162 respondents. The resulting structural model is illustrated in Figure 2. The coefficient of determination (R^2) was used to evaluate the explanatory power of the model, indicating the proportion of variance in the endogenous construct explained by the exogenous variables. The analysis revealed a moderate R^2 value of 0.473 for stickiness intention, suggesting that approximately 47.3% of the variance in this construct is accounted for by the predictors[45].

Table 3: Psychometric properties of the scales (n = 162).

Construct	Items	Loadings	CR	Cronbach's Alpha	AVE
Online service failure	NSF1	0.753	0.920	0.915	0.627
	NSF2	0.776			
	NSF3	0.767			
	NSF4	0.799			
	NSF5	0.833			
	NSF6	0.775			
	NSF7	0.863			
	NSF8	0.765			
Offline service failure	FSF1	0.899	0.816	0.817	0.734
	FSF2	0.879			
	FSF3	0.788			
Service recovery	DJ1	0.879	0.905	0.856	0.631
	DJ2	0.818			
	IJ2	0.718			
	PJ2	0.740			
Stickiness intention	SI1	0.915	0.918	0.906	0.781
	SI2	0.889			
	SI3	0.875			
	SI4	0.853			

Table 4: Mean, SD, AVE and intercorrelations of the latent variables

	Mean	SD	Online service failure	Offline service failure	Service recovery	Stickiness intention
Online service failure	4.965	1.162	0.792			
Offline service failure	4.198	1.417	0.407	0.857		
Service recovery	3.635	.912	-0.542	-0.653	0.795	
Stickiness intention	4.599	.856	-0.475	-0.566	0.648	0.884

Note: Bold diagonal numbers are the square roots of AVE.

The hypothesis testing results indicate that:

- Online service failure has a significant negative effect on stickiness intention (H1: $\beta = -0.158$, $p < 0.01$),
- Offline service failure also exhibits a significant negative effect on stickiness intention (H2: $\beta = -0.235$, $p < 0.001$), and
- Service recovery has a significant positive effect on stickiness intention (H3: $\beta = 0.409$, $p < 0.001$).

Collectively, these findings provide empirical support for all proposed hypotheses, highlighting the critical roles of service failures (both online and offline) and service recovery in shaping customers' stickiness intentions within an omnichannel service environment.

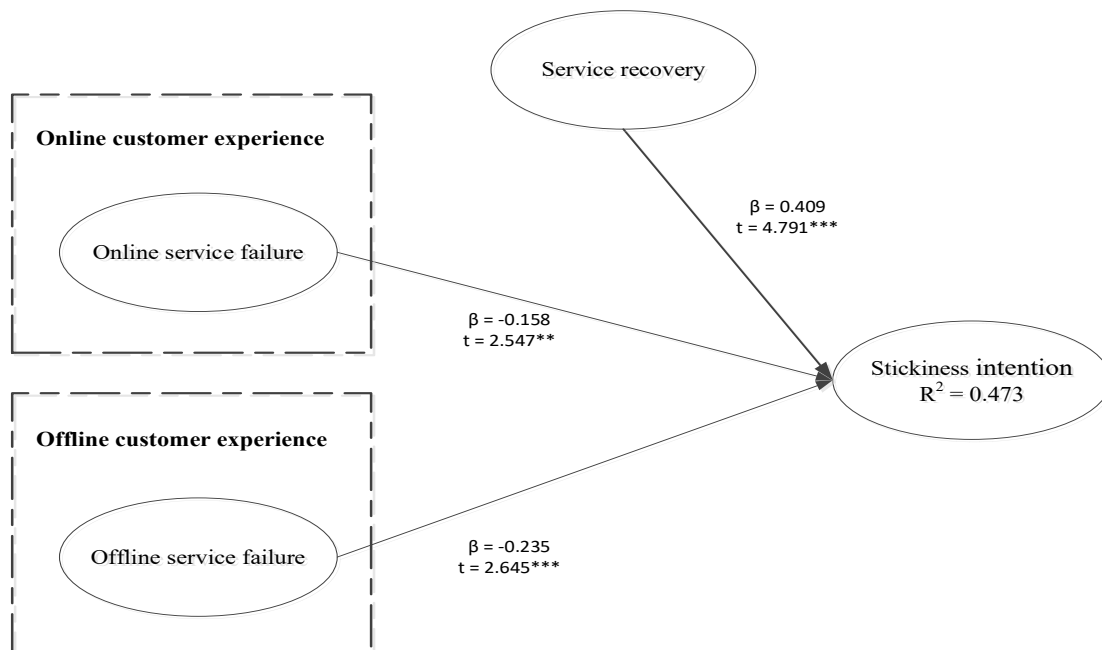


Figure 2: PLS Structural Model

Note(s): ** Denotes path coefficients significant at the $p < 0.01$ level.

*** Denotes path coefficients significant at the $p < 0.001$ level.

V. Conclusion

This study aimed to investigate the relationships among the online service failure, offline service failure, service recovery and stickiness intention in the context of omnichannel service. Theoretical contributions and practical implications of the findings are presented and discussed in the subsequent sections.

1. Theoretical implications

First, this study extends Expectation Confirmation Theory (ECT) into the omnichannel service context, offering a novel framework to examine how service failures and service recovery influence customer stickiness intention. Second, by distinguishing between online and offline service failures, the study introduces a more nuanced understanding of service disruption in omnichannel environments, which advances theoretical development in both service management and omnichannel retailing research. Third, the research contributes to the customer relationship management literature by highlighting the interacting roles of service recovery in shaping post-failure customer's stickiness intentions. The results show that all path coefficients in the hypothesized model are statistically significant and substantial. The variance explained for each factor suggests that, collectively, these predictors offer meaningful insights into how the online service failures, offline service failures and service recovery in omnichannel service influences customers' stickiness intentions.

These findings indicate that both online and offline service failures negatively affect customers' stickiness intention, whereas effective service recovery exerts a positive influence. Although service failures are often unavoidable, it remains imperative for omnichannel service providers to proactively minimize their occurrence and mitigate their adverse effects. Accordingly, this study recommends that omnichannel service providers not only review past

service failure incidents but also evaluate whether appropriate corrective and preventive measures have been implemented to avoid recurrence. Where resources permit, providers should also consider examining service failure cases from other industries—across both online and offline contexts—to reflect on and improve their own operational procedures, thereby reducing the likelihood of future service failures. In cases where service failures occur despite preventive efforts, it is essential to implement a fair and transparent service recovery process. Customers must perceive the outcome of the recovery as fair (distributive justice), the provider's attitude as respectful and sincere (interactional justice), and the recovery procedures and policies as consistent and appropriate (procedural justice) [2; 37]. Moreover, omnichannel service providers are encouraged to tailor their remediation strategies to the specific social context in which the failure occurs and to institutionalize knowledge gained from past recovery experiences [50]. By doing so, they can strengthen customer trust and loyalty, thereby enhancing the likelihood that customers will continue to engage with and reuse the services offered by the omnichannel platform in the future [42].

2. Practical implications

First, the findings offer actionable insights for omnichannel service providers to manage both online and offline service failures aimed at enhancing customer stickiness. Second, retailers can leverage these insights to prioritize investments in service recovery mechanisms that are tailored to the characteristics of specific service channels (e.g., e-commerce vs. physical stores), thereby enhancing the overall customer experience. Third, by emphasizing the importance of long-term customer relationships, this study highlights that service recovery should not be viewed solely as a damage control mechanism, but rather as a strategic tool for reinforcing customer loyalty and improving long-term profitability. As customer stickiness increases, so does the likelihood of repeat transactions and continued engagement with the omnichannel provider [51]. Therefore, customer stickiness emerges as a critical determinant of the sustainable development and competitive advantage of omnichannel service models [11].

The results confirm that online and offline service failures serve as significant antecedents of stickiness intention in an omnichannel context. Therefore, this study suggests that omnichannel service providers can improve customer stickiness intention by reducing online and offline service failures. This study further analysis reveals that online service environment is highly saturated with homogeneous e-commerce platforms, making it easy for consumers to disengage following an unsatisfactory experience. When online service failures occur, customers may be less tolerant and more likely to either abandon the transaction, terminate their relationship with the service provider, or simply switch to a competing website with minimal effort [52]. The offline service failures are often associated with employee-related issues, such as poor service attitude, delayed response to customer requests, or a lack of product/service knowledge and professionalism—factors that hinder the fulfillment of customer needs. Because offline interactions typically involve face-to-face contact, service failures in this context may evoke stronger negative emotional responses, thereby reducing customers' willingness to continue using the service. Therefore, this study recommends that omnichannel service providers enhance customer stickiness intention by systematically reducing both online and offline service failures. In addition, once service failures inevitably occur, omnichannel service providers should adopt a proactive and empathetic approach to resolving customer issues. Doing so can lead to greater customer satisfaction with how the failure is addressed, fostering

emotional connection and identification with the service provider, which in turn enhances customer stickiness to the omnichannel platform [53].

3. Limitations and Future Research

This study aims to examine the relationships among online service failures, offline service failures, service recovery, and stickiness intention within the context of omnichannel services. While the findings offer valuable insights, several limitations should be acknowledged, and they suggest directions for future research to enhance the generalizability and robustness of the results. First, the study was conducted exclusively in Taiwan, which may limit the applicability of the findings to other geographic or cultural contexts. Consumer expectations, perceptions of service quality, and reactions to service failures and recovery efforts may vary significantly across cultures. Therefore, future research should consider adopting cross-national or cross-cultural comparative designs to better understand how cultural factors influence customer experiences and stickiness intentions in omnichannel environments. Second, this study focused primarily on customers' perceptions of service failures and recovery, potentially overlooking other important psychological or contextual variables that may shape consumer behavior. For example, variables such as trust, emotional responses, brand attachment, or channel-switching tendencies could play critical roles as mediating or moderating factors in the relationship between service quality, recovery, and customer stickiness. Future studies may incorporate these constructs to extend the current framework, thereby offering a more comprehensive understanding of how customers respond to omnichannel service encounters. Third, while this study distinguishes between online and offline service failures, it treats their effects on stickiness intention as independent paths. Future studies could extend this framework by explicitly examining potential interaction effects between online and offline failures. Such research would contribute to a deeper understanding of how the integration of physical and digital channels shapes customer evaluations and stickiness intentions in omnichannel contexts.

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